Progress Report for 1972

THE IMPACT OF REDHEADED PINE SAWFLY ON RED PINE IN MICHIGAN

and

REDHEADED PINE SAWFLY POPULATION BUILD-UP FOLLOWING CHEMICAL CONTROL

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By

R.D. Averill and R.F. Fowler[1]

INTRODUCTION

This progress report updates the report for the year 1971 (June 30, 1972). Project organization remains the same with excellent cooperation received from Federal, State and private land managers and owners.

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OBJECTIVES

The objectives as set forth in the study plans are:

1. To determine the impact of the redheaded pine sawfly on young hard pine plantations.

2. To determine rapidity of population build-up in young pine plantations following control operations.

HIGHLIGHTS

Insect

Field observations and preliminary analysis of the data allow the following conclusions: Population levels remain moderately high on the Cadillac Ranger District although the population has collapsed in the Anderson Study Plantation. Observations of female flight habits show the females to be sluggish fliers, but they take to flight readily when disturbed. During these flights, the female showed no preference for alighting in shaded vs. sunny locations.

An average of 65% egg mortality was recorded during the 1972 field season. The cause is being investigated. Larval mortality is low except on trees growing in well developed soils. Each larva requires an average of 3-4 cm of foliated branch to complete its life cycle.

Parasites are being reared from cocoons. Emergence was not complete at the time of this report, but two hymenopterous species, *Perilampus sp.* and *Exenterus amictorius* (Panz.) dominate the collection. The latter was reared from *Neodiprion lecontei* in Michigan for the first time in 1972.

Sawfly populations in the two sprayed plantations remain low. One plantation was sprayed in 1969 and the other in 1970. No colony distribution pattern is apparent with such a low population.

Tree

New foliage grown the year following attack reduced the percentage of overall tree defoliation 10 to 20% on trees less than 65% defoliated. For example, a tree that had 40% of its foliage removed in 1970 (tree left with 60% of its normal complement of needles) would be classed as 20 to 30% defoliated following the 1971 growing season. In other words, the tree would have recovered to the extent of having 70 to 80% of its normal needle complement.

Terminal shoots with less than 90% defoliation show a marked increase in growth the second year following defoliation as compared to the first year. Terminals with greater than 95% defoliation usually die the year following attack.

Foliar analysis of attacked and non-attacked trees is being made as a possible survey and evaluation tool. The results may tell the type of stress the tree is under. The essential elements N,P, and K and some minor elements are being measured.

Killing of the terminal branches causes crooks and lumber degrade. Data are being collected to allow an economic analysis of various management alternatives. The "PSCD" Survey[2] has been refined; still considerable judgment is required. The greatest economic loss will probably occur in intermediate cuttings. Very severely attacked stands probably will have some sawlog losses. Basal area surveys show reductions up to 40% b.a. in attacked stands.

Weather

Data accumulated to date indicates that droughty conditions exist before population buildup. Palmer Drought Index[3] values for the period 1929 to date show a positive correlation of sawfly population buildups and negative index readings.

Site

Site conditions in attacked and non-attacked areas are being noted. Trees on soils with well-developed profiles have not been successfully attacked whereas trees on soils with poorly developed or disturbed profiles and low moisture-holding capacity are attacked. These contrasting conditions often occur

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2/Explained in Progress Report for 1971. The system rates the trees as to potential product, i.e., pulpwood or sawlog; or condition, i.e., cull or dead, on the basis of sawfly damage.

3/The Palmer drought index shows when a crop is under stress. The index takes into account the soil management group, crop, moisture depletion, temperature, humidity, wind, and precipitation. Isopleth lines are drawn for the geographic area of interest. By knowing the rooting pattern for the crop of interest, the time and duration the crop is under stress can be determined. The index figures for 1929-1963 are in a MSU publication. The system was published by the U.S. Meterological Service.

in close proximity within the same stand or plantation. Pines with roots competing with bracken fern and/or some hardwood species are more heavily attacked than trees not in such competition. Red pine growing in our study plots in association with cherry are seldom attacked.

Attempts at establishing the sawfly in a stand of red pine growing on a well-developed soil profile failed.

1973 PROGRAM

The measurements prescribed in the work plan will be continued for the third year. Red pine stands in Upper Michigan, northern Wisconsin, southern Ontario, and New York will be examined to test whether the information gathered in the Cadillac area is true of sawfly populations in other areas.

A hazard rating system will be developed for predicting the severity of a sawfly outbreak in a plantation or potential planting area.

Detailed reports of these projects will be prepared for publication following the 1973 field season.

REFERENCES

Averill, R.D., Fowler, R.F. Progress Report 1971, The Impact of redheaded pine sawfly on red pine in Michigan and redheaded pine sawfly population buildup following chemical control. S&PF Field Office, St. Paul, Minnesota, 10p.

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